# SERVICE MANUAL

DATSUN PICK-UP
MODEL 620 SERIES
**CHASSIS & BODY**

NISSAN

**NISSAN MOTOR CO., LTD.**
TOKYO, JAPAN

## SECTION TM

# TRANSMISSION

TM

# TRANSMISSION

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## DESCRIPTION

The model 620 series vehicles adopt the type F4W63 (4-FORWARD, 1-REVERSE – FLOOR SHIFT) and type R4W63 (4-FORWARD, 1-REVERSE – COLUMN SHIFT) transmissions.

These transmissions are of a fully synchronized type (WARNER TYPE) that uses helical gears.

The reverse gear is a sliding-mesh type using spur gears.

In construction, the main drive shaft gear is meshed with the counter drive gear. The forward speed gears formed on the countershaft are in constant mesh with the main shaft gears.

Each of the main gears rides on the main shaft through the needle roller bearing, thus rotating freely on the main shaft.

When the transmission is shifted, the coupling sleeve is slided on the synchronizer hub. This action engages its inner teeth with the outer teeth provided on the main shaft gear.

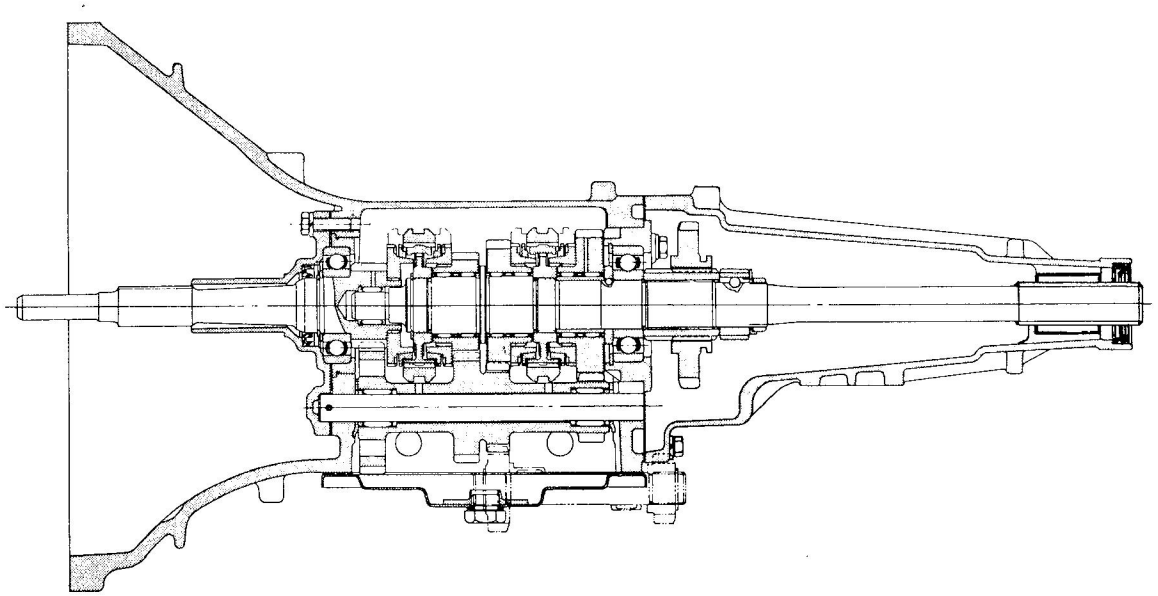
The synchronizer hub is fitted to the main shaft by splines, so they turn together, as the main shaft is rotated.

Placing speed control lever in the reverse position throws the main shaft reverse gear into engagement with the reverse idler gear; the transmission is reversed.

These transmissions consist of the complete transmission case, rear extension housing and gear assembly. The complete transmission case and rear extension housing are made of aluminum alloy metal.

The clutch housing and transmission case are combined to a single unit as the complete transmission case. The complete transmission case is provided with a bottom cover. With this construction, maintenance service can be made easily.

This chapter describes about the type R4W63 transmission.



TM301

*Fig. TM-1 Sectional view of type R4W63 transmission*

# REMOVAL AND INSTALLATION

## Removal

In dismounting transmission from vehicle, proceed as follows;

1. Disconnect battery ground cable from terminal.
2. Jack up vehicle and support it with four stands.

Recommend a hydraulic hoist or open pit be utilized, if available. Make sure that safety is insured.

3. Remove four spring pins and disconnect select and shift rods from select ① and shift ② levers. Remove cross shaft assembly from transmission case and side member.
4. Disconnect front exhaust tube ③ from exhaust manifold.
5. Remove clutch operating cylinder ④ from transmission case.
6. Disconnect speedometer drive cable ⑤ from transmission extension housing and back up light switch wires ⑥ at their connections.

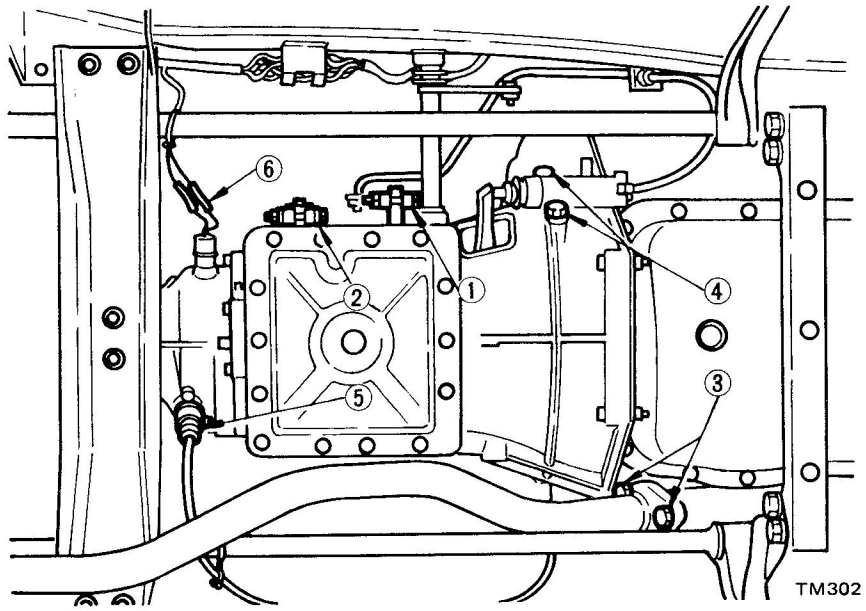



*Fig. TM-2 Bottom view of vehicle*

7. Remove bracket holding center bearing on 3rd cross member by loosening off attaching bolts.

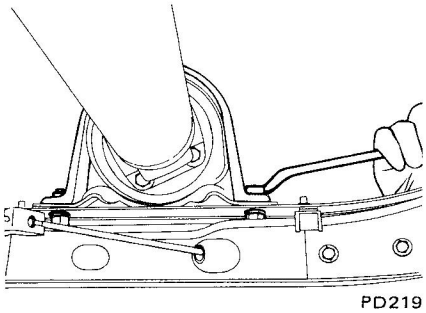



*Fig. TM-3 Removing center bearing holding bracket*

8. Detach propeller shaft from companion flange of gear carrier by backing off four bolts.

**Note: Plug up the opening in the rear of rear extension housing to prevent oil from flowing out.**

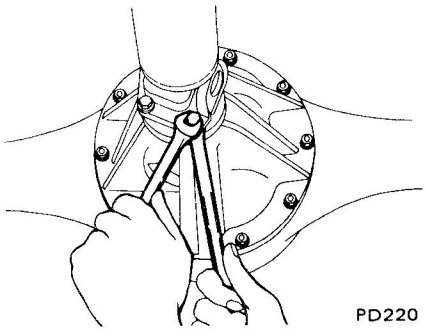



*Fig. TM-4 Removing four bolts securing propeller shaft to companion flange*

9. Support engine by locating a jack under oil pan with a wooden block used between oil pan and jack.

Be careful not to apply jack to oil pan drain plug.

10. Remove rear engine mount securing bolts ① and cross member mounting bolts ②.

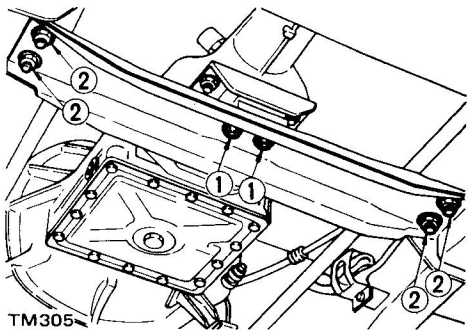



*Fig. TM-5 Removing rear engine mount*

11. Remove starting motor.
12. Remove bolts securing transmission to engine, pull out transmission to rear once, place the rear portion of rear extension housing on cross member, and then pull it down toward front.

**Note: Take care in dismounting transmission not to strike any adjacent part and drive shaft.**

## Installation

To install, reverse the order of removal observing the following note.

Remove filler plug at the inspection hole, and fill transmission case with recommended gear oil to the level of the filler hole. [Approximately 1.7 liters (½ U.S.gal., 38 Imper.gal.).

The tightening torque of engine to transmission case mounting bolt: 2.4 to 2.8 kg-m (17 to 20 ft-lb).

# DISASSEMBLY AND ASSEMBLY

## Disassembly

Prior to disassembling transmission, thoroughly wipe off dirt and grease from it.

2. Drain lubricant.

3. Detach dust cover from transmission case. Remove withdrawal lever and release bearing.

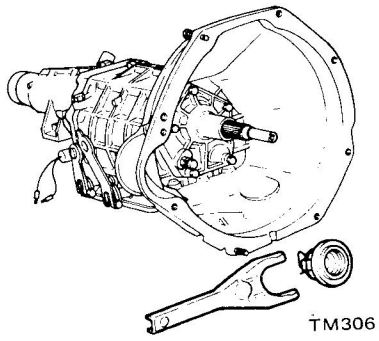



*Fig. TM-6 Removing withdrawal lever and release bearing*

4. Remove five front cover securing bolts and detach front cover.

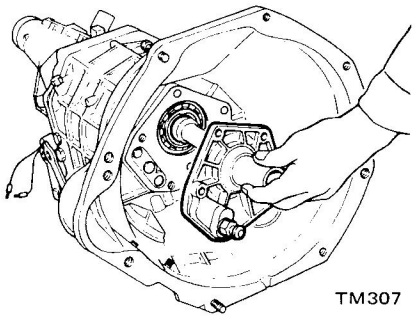



*Fig. TM-7 Detaching front cover*

5. Detach bottom cover from transmission case.
6. Remove back up light switch and speedometer pinion with speedometer sleeve.
7. Remove rear extension housing securing bolts.

Detach rear extension houisng.

**Note: If rear extension houisng cannot be removed easily, lightly tap it with a soft hammer.**

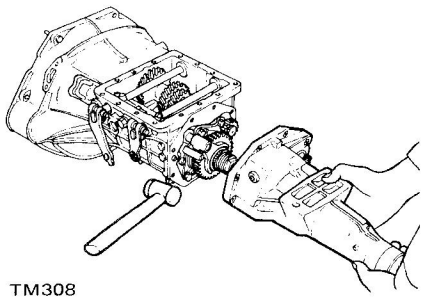



*Fig. TM-8 Detaching rear extension housing*

Gear assemblies

1. Unscrew check ball plugs, take out three locking springs and three check bolts. Take care not to lose these parts.
2. Remove lock pins ① used to fix cross shaft and operating lever assembly prying off snap rings ② and withdraw cross shafts together with their outer levers, then take out arms and rods assembly.

**Note: When withdrawing cross shafts, be careful not to damage oil seal lips and grooves with snap rings.**

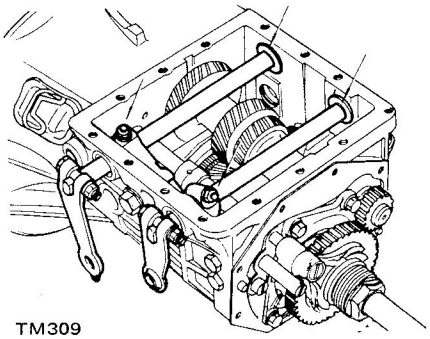



*Fig. TM-9 Removing cross shafts*

3. Mesh gears at two places. Straighten lock washer and then loosen lock nut on main shaft.
4. Drive out countershaft from the rear of transmission case with the use of Countershaft Guide ST23100000, and then take out countergear togethe; with Countershaft Guide.

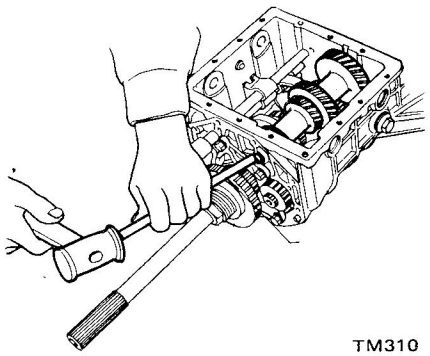



*Fig. TM-10 Driving out countershaft*

Be careful not to drop needle bearing in countergear into transmission case.

**Note: Make sure that washers between countergear and case are removed.**

5. Pry off snap ring retaining reverse idler gear (helical gear).

Take out reverse idler gear from reverse idler gear shaft and then withdraw reverse idler gear shaft with idler gear (spur gear) from the rear side of transmission case.

6. Drive out retaining pins by using Fork Rod Pin Punch ST23540000.

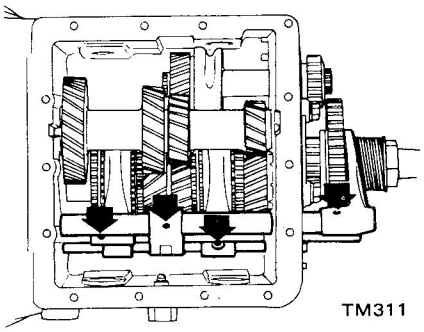



*Fig. TM-11 Driving out retaining pins*

7. Drive out fork rods removing shift forks and fork rod brackets.
8. Remove bolts securing main shaft bearing retainer and then withdraw main shaft assembly from the rear side.
9. Remove main drive gear from the front side, after taking out pilot bearing located between main shaft and main drive gear.

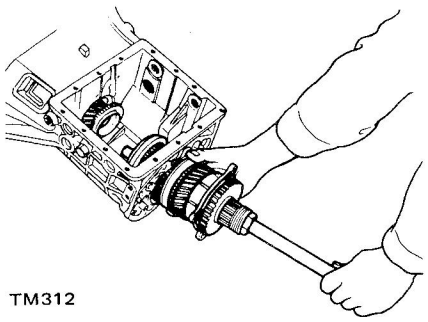



*Fig. TM-12 Withdrawing main shaft assembly*

**Note: When main shaft assembly and/or main drive gear cannot be removed easily, lightly tap transmission case with a soft hammer.**

## Main shaft assembly

1. Pry off snap ring on the front end of main shaft, and remove 3rd-4th synchromesh assembly and 3rd gear.

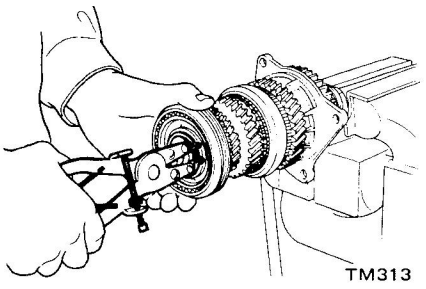



*Fig. TM-13 Prying off snap ring*

2. Remove main shaft lock nut loosened previously and remove lock washer, speedometer drive gear, steel ball, reverse gear and reverse hub.
3. In removing main shaft bearing, apply the front end of 1st gear to Bearing Replacer ST22130000 and withdraw bearing together with bearing retainer, thrust washer, and 1st gear simultaneously by using a press.

And then take out steel ball, needle roller bearing and baulk ring.

**Note: Do not apply this tool to 2nd gear, or it may damage 1st gear bushing.**

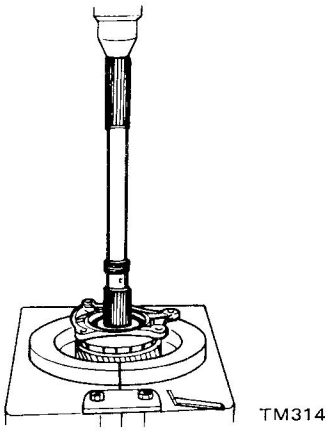
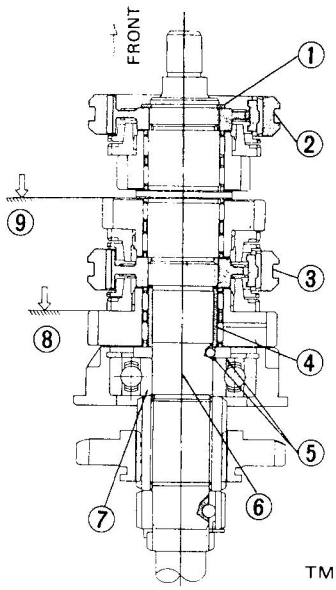


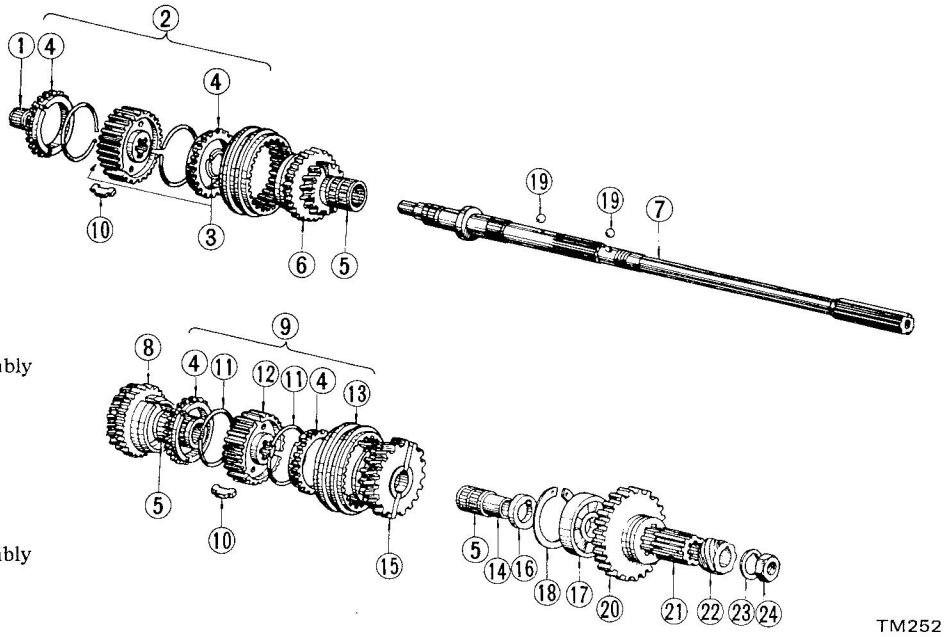

*Fig. TM-14 Removing main shaft bearing*

4. As 1st gear bushing is tightly fitted to main shaft, support the front end of 2nd gear, and withdraw 1st-2nd synchro-assembly, 2nd gear and bushing all together by using a press.




1 Snap ring
2 3rd-4th synchronizer assembly
3 1st-2nd synchronizer assembly
4 1st gear bearing bushing
5 Thrust washer and ball
6 Main shaft
7 Main shaft bearing
8 Support this end with Bearing Replacer ST22130000, depress main shaft forward, and withdraw bearing together with 1st gear
9 Support this end, and withdraw 1st gear bearing bushing together with synchronizer assembly and 2nd gear.

*Fig. TM-15 Cross sectional view of main shaft assembly*

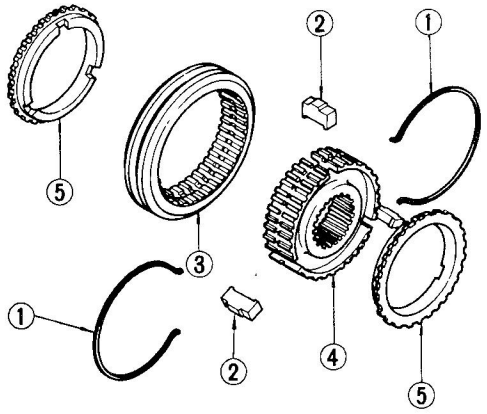



1 Pilot bearing
2 3rd & 4th synchromesh assembly
3 Snap ring
4 Baulk ring
5 Needle bearing
6 3rd speed gear, main shaft
7 Main shaft
8 2nd speed gear, main shaft
9 1st & 2nd synchromesh assembly
10 Shifting insert
11 Spread spring
12 Synchronizer hub
13 Coupling sleeve
14 Bush, 1st gear
15 1st speed gear, main shaft
16 Thrust washer, main shaft
17 Main shaft bearing
18 Snap ring, main shaft bearing
19 Steel ball
20 Reverse gear
21 Reverse hub
22 Speedometer drive gear
23 Lock plate
24 Nut

*Fig. TM-16 Exploded view of main shaft assembly*

### Synchromesh assembly

1. Remove spread springs ① and take out shifting inserts ②.
2. Separate coupling sleeve ③ from synchro hub ④.

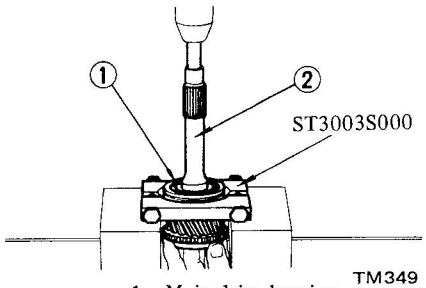



1 Spread spring
2 Shifting insert
3 Coupling sleeve
4 Synchro hub
5 Baulk ring

*Fig. TM-17 Exploded view of synchromesh assembly*

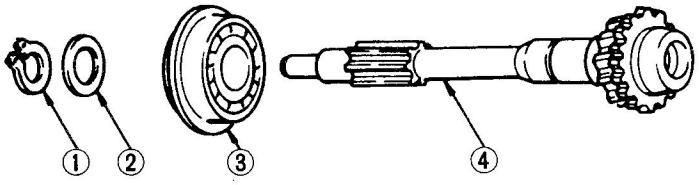
### Main drive gear

1. Pry off snap ring from the front side of main drive gear bearing and remove spacer.
2. Remove main drive gear bearing by using Bearing Puller ST3003S000 and a suitable press.




1 Main drive bearing
2 Main drive gear

*Fig. TM-18 Driving out main drive gear bearing*




1 Snap ring
2 Spacer
3 Main drive bearing with snap ring
4 Main drive gear

*Fig. TM-19 Exploded view of main drive gear*

## Assembly

To assemble, reverse the order of disassembly observing the following instructions:

### Front cover and rear extension housing

1. Make sure that oil seal mating surface is clean.
2. Press new oil seal into position using a press.

**Note: Apply gear oil to oil seal lip when installing oil seal.**

### Main shaft assembly

1. Wash clean all parts with solvent and dry with compressed air.
2. Assemble synchromesh assembly in the following procedures.

(1) Place synchro-hub into coupling sleeve.

(2) Fit shifting inserts in their grooves in synchro-hub.

(3) Locate one spread spring on the lower side of shifting inserts to secure them to the inner side of coupling sleeve.

Install the other spread spring on the opposite side of synchro hub.

**Note: Make sure that spread springs are installed opposite to each other.**

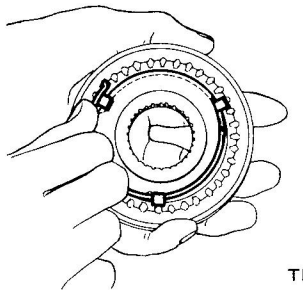



*Fig. TM-20 Installing spread spring*

3. Install the following parts to main shaft in the order listed below.

2nd gear needle roller bearing, 2nd gear, 2nd gear baulk ring and 1st-2nd speed synchromesh assembly.

**Note: Install 1st-2nd synchromesh assembly on main shaft referring to Figure TM-23.**

4. When fitting 1st gear bushing onto main shaft, drive bushing by using a proper brass drift.

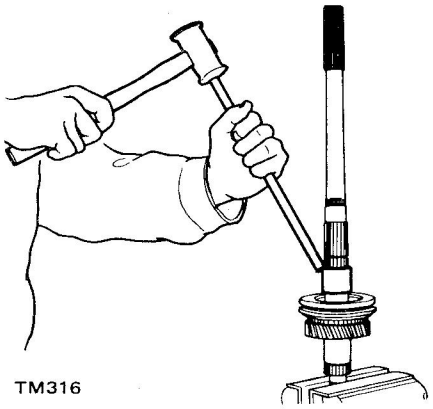



*Fig. TM-21 Driving bushing*

5. Then, install 1st gear baulk ring, 1st gear needle roller bearing, 1st gear, steel ball and thrust washer to main shaft.

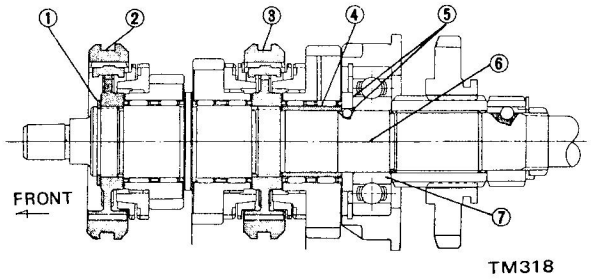
**Note: Apply grease to steel ball when installing.**

6. Fit main shaft bearing with bearing retainer to main shaft by using Transmission Adapter ST23800000.


*Fig. TM-22 Fitting main shaft bearing*

7. Install reverse hub, reverse gear, steel ball, speedometer drive gear, lock washer and lock nut onto main shaft.

And tighten lock nut temporarily. See Figure TM-23.




1 Snap ring
2 3rd-4th synchronizer assembly
3 1st-2nd synchronizer assembly
4 1st gear bearing bushing
5 Thrust washer and ball
6 Main shaft
7 Main shaft bearing

*Fig. TM-23 Sectional view of main shaft assembly*

8. Install 3rd gear needle roller bearing, 3rd gear, baulk ring and 3rd-4th synchromesh assembly onto main shaft.

9. Fit a suitable snap ring in place so that there exists a minimum clearance between the end face of hub and ring groove. See Figure TM-23.

**Available hub snap ring**

| No. | Thickness mm (in) |
|---|---|
| 1 | 1.40 to 1.45 (0.0551 to 0.0571) |
| 2 | 1.45 to 1.50 (0.0571 to 0.0591) |
| 3 | 1.50 to 1.55 (0.0591 to 0.0610) |
| 4 | 1.55 to 1.60 (0.0610 to 0.0630) |
| 5 | 1.60 to 1.65 (0.0630 to 0.0650) |

10. Insert main shaft assembly into position from the rear side of transmission case and secure it to transmission case with bearing retainer mounting bolts.

Tightening torque:
0.8 to 1.0 kg-m
(5.8 to 7.2 ft-lb)

11. Retighten lock nut to the specified torque 8.0 to 11.0 kg-m (58 to 80 ft-lb) with gears meshed at two places after installing reverse idler gear and countergear. And firmly bend lock washer.

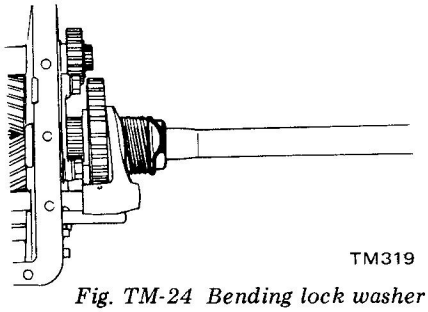



*Fig. TM-24 Bending lock washer*

## Main drive gear assembly

1. Using Bearing Puller ST3003S000, press main drive gear bearing onto the shaft of main drive gear.

2. Install a set of suitable spacer and snap ring onto the shaft so that there exists a minimum of clearance between the groove for snap ring and the end face of spacer.

**Available snap ring**

| No. | Thickness mm (in) |
|---|---|
| 1 | 1.49 to 1.55 (0.0587 to 0.0610) |
| 2 | 1.55 to 1.62 (0.0610 to 0.0638) |
| 3 | 1.62 to 1.68 (0.0638 to 0.0661) |
| 4 | 1.68 to 1.74 (0.0661 to 0.0685) |
| 5 | 1.74 to 1.80 (0.0685 to 0.0709) |
| 6 | 1.80 to 1.86 (0.0709 to 0.0732) |
| 7 | 1.86 to 1.92 (0.0732 to 0.0756) |

3. Install main drive gear assembly into transmission case from the front side.

Prior to installing main drive gear assembly, be sure to install plot bearing in place.

## Reverse idler gear assembly

1. Install spur gear ③ onto the one end of reverse idler shaft ① with the larger groove and fit snap ring ② into the groove. See Figure TM-23.
2. With washer ④ placed in its position, insert reverse idler shaft assembly into transmission case from the rear side.

**Note: Be sure to align the hollow surface of this washer with the oil groove in spur gear.**

3. Insert a 0.1 mm (0.0039 in) thickness gauge between spur gear ③ and washer ④. With shaft ① pushed fully toward the front, install washer ⑤ and helical gear, and then fit snap ring ⑦ of the suitable thickness in position so that the specified reverse gear end play is obtained.

Standard reverse gear end play:
0.05 to 0.15 mm
(0.0020 to 0.0059 in)

**Available snap ring**

| No. | Thickness mm (in) |
|---|---|
| 1 | 1.15 to 1.25 (0.0453 to 0.0492) |
| 2 | 1.35 to 1.45 (0.0531 to 0.0571) |
| 3 | 1.25 to 1.35 (0.0492 to 0.0531) |
| 4 | 1.45 to 1.55 (0.0571 to 0.0610) |
| 5 | 1.05 to 1.15 (0.0413 to 0.0453) |

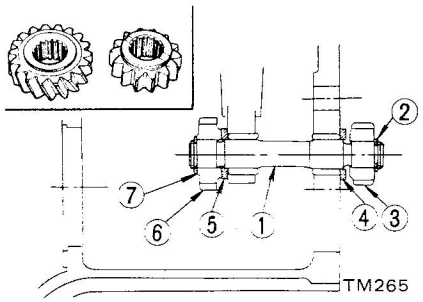



*Fig. TM-25 Assembling reverse idler gear assembly*

## Countergear assembly

1. To install needle roller bearing ③ in its position, insert Countershaft Guide ST23100000 in countergear ① and then install washer ②, bearings ③ and washer in place.

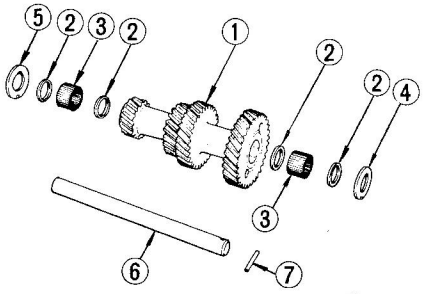



*Fig. TM-26 Exploded view of countergear assembly*

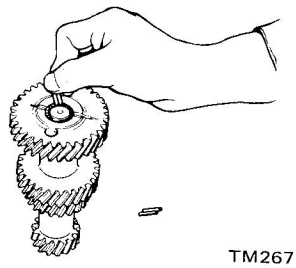



*Fig. TM-27 Installing needle roller bearing*

2. Install these parts together with washers ④ and ⑤ to transmission case, and insert countershaft ⑥ into transmission case, and then drive pin ⑦ in its hole on the front side of countershaft.
3. Select and install rear thrust washer of the suitable thickness so that the specified countergear end play is obtained.

Standard countergear end play:
0.05 to 0.15 mm
(0.0020 to 0.0059 in).

**Available rear thrust washer**

| No. | Thickness mm (in) |
|---|---|
| 1 | 2.35 to 2.40 (0.0925 to 0.0945) |
| 2 | 2.40 to 2.45 (0.0945 to 0.0965) |
| 3 | 2.45 to 2.50 (0.0965 to 0.0984) |
| 4 | 2.50 to 2.55 (0.0984 to 0.1004) |
| 5 | 2.55 to 2.60 (0.1004 to 0.1024) |

## Shift forks, shift rods and operating lever assembly

1. Install 1st-2nd shift fork and 3rd-4th shift fork to the grooves in their coupling sleeves and reverse-shift fork to the groove in reverse gear.
2. Insert 1st-2nd shift rod into transmission case through 1st-2nd shift fork installing 1st-2nd shift rod bracket in its position, and then drive pins into 1st-2nd shift rod bracket and 1st-2nd shift fork securely.

With 1st-2nd shift rod in neutral position, install interlock plunger in its position.

3. Insert 3rd-4th shift rod into transmission case through 3rd-4th shift fork installing 3rd-4th shift rod bracket in its position, and then drive pins into them.

With 3rd-4th shift rod in neutral position, install interlock plunger in its position.

4. Insert reverse shift rod into transmission case through reverse shift fork installing reverse shift rod bracket in its position.

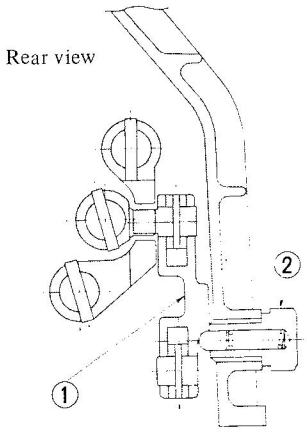
And put check balls and locking springs into each hole in transmission case and then install check ball plugs applying thread locking agent.

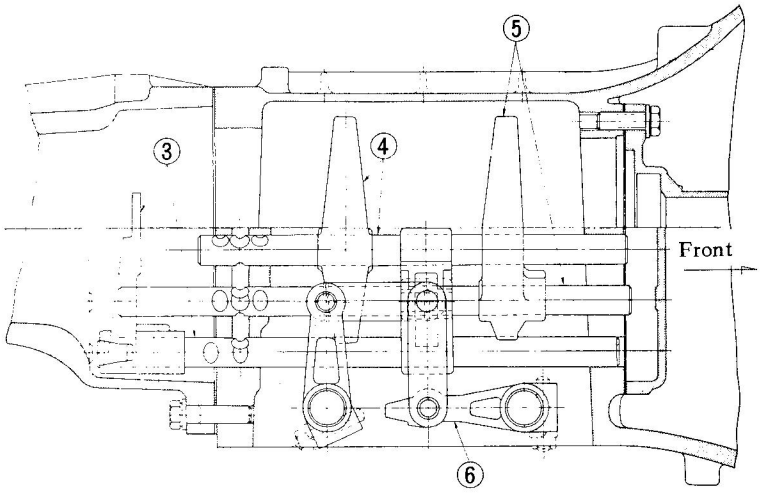
5. Assemble operating lever assembly inserting cross shafts into transmission case and operating levers.

Be sure to install thrust washers and snap rings when inserting cross shafts.

6. Secure operating levers with lock pins.

Lock pin tightening torque:
0.3 to 0.4 kg-cm
(0.26 to 0.35 in-lb)

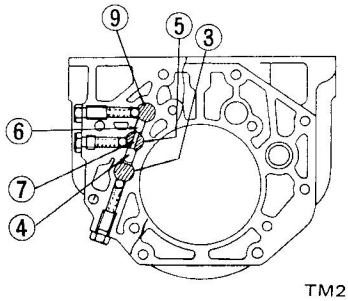



TM320

1 Operating lever assembly
2 Reverse check
3 Reverse shift fork and shift rod
4 1st and 2nd shift fork and shift rod
5 3rd and 4th shift fork and shift rod
6 Operating lever assembly

*Fig. TM-28 Layout of shift forks and operating lever*




TM270

*Fig. TM-29 Interlock mechanism*

7. Apply gear oil to all sliding parts and make sure that gears are meshed smoothly in their positions.

### Complete transmission assembly

1. Install rear extension housing to transmission case.

Rear extension houisng bolt tightening torque: 1.4 to 1.8 kg-m (121.5 to 156.2 in-lb)

**Note: Apply sealant to each face of gasket to prevent oil leak.**

2. Install speedometer pinion assembly to rear extension housing, and secure it with lock plate.
3. Install front cover to the front of transmission case.

Front cover bolt tighteing torque:
0.8 to 1.0 kg-m
(5.8 to 7.2 ft-lb)

4. Install release bearing, withdrawal lever and dust cover in their positions.
5. Install bottom cover to transmission case.

Bottom cover bolt tighteing torque:
0.8 to 1.0 kg-m
(5.8 to 7.2 ft-lb)

## INSPECTION

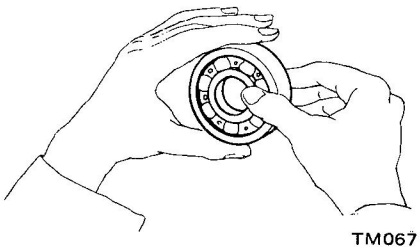
Thoroughly clean all disassembled parts with cleaning solvent and check for wear, damage or other defective conditions.

## Transmission case and rear extension housing

Clean with solvent and check for any crack which may be the cause of oil leak.
2. If rear extension bushing is worn or cracked, replace it as a unit of bushing and extension housing.

## Bearing

1. Wipe oil or grease clean on bearing and dry these parts with compressed air.
2. Check balls, outer race and inner race for wear, burr or other damages. Also check for smooth operation. If necessary, replace.



TM067

*Fig. TM-30 Inspecting ball bearing*

3. Replace needle bearings which are excessively worn or damaged.

## Gears and shafts

1. Check gears for wear, burr or damage and, if necessary, replace.
2. Check shafts and their splines for wear, crack or bending. If necessary, replace any defective gear or shaft.

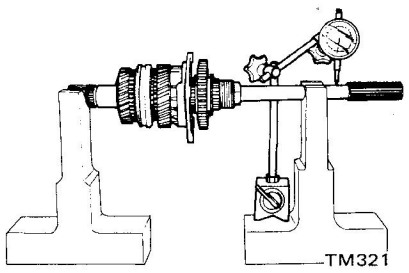



*Fig. TM-31 Checking main shaft for straightness*

3. Check gears for end play

Standard gear end play (1st, 2nd, 3rd and reverse idler gears): 0.05 to 0.15 mm (0.0020 to 0.0059 in)

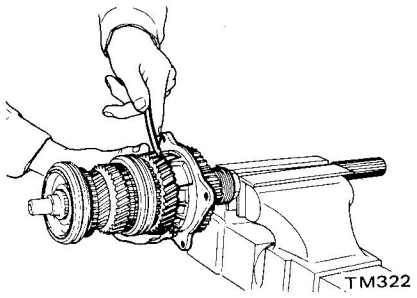



*Fig. TM-32 Measuring gear end play*

4. Measure backlash in gears.

Standard backlash: 0.05 to 0.10 mm (0.0020 to 0.0039 in)

If the measured backlash is exceeded, replace drive and driven gears as a set.

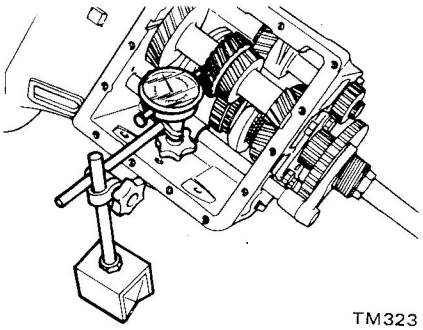



*Fig. TM-33 Measuring gear backlash*

## Baulk rings

1. If any baulk ring is found to be deformed or cracked, replace it.
2. Position baulk ring in place on the gear cone, and measure the baulk ring to gear clearance with baulk ring fully pushed toward gear.

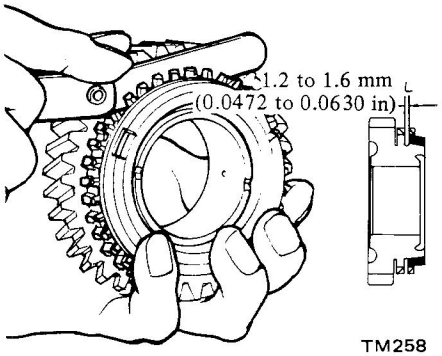



*Fig. TM-34 Baulk ring to cone gap*

The standard baulk ring to cone clearance is 1.2 to 1.6 mm (0.0472 to 0.0630 in).

# TYPE F4W63 TRANSMISSION

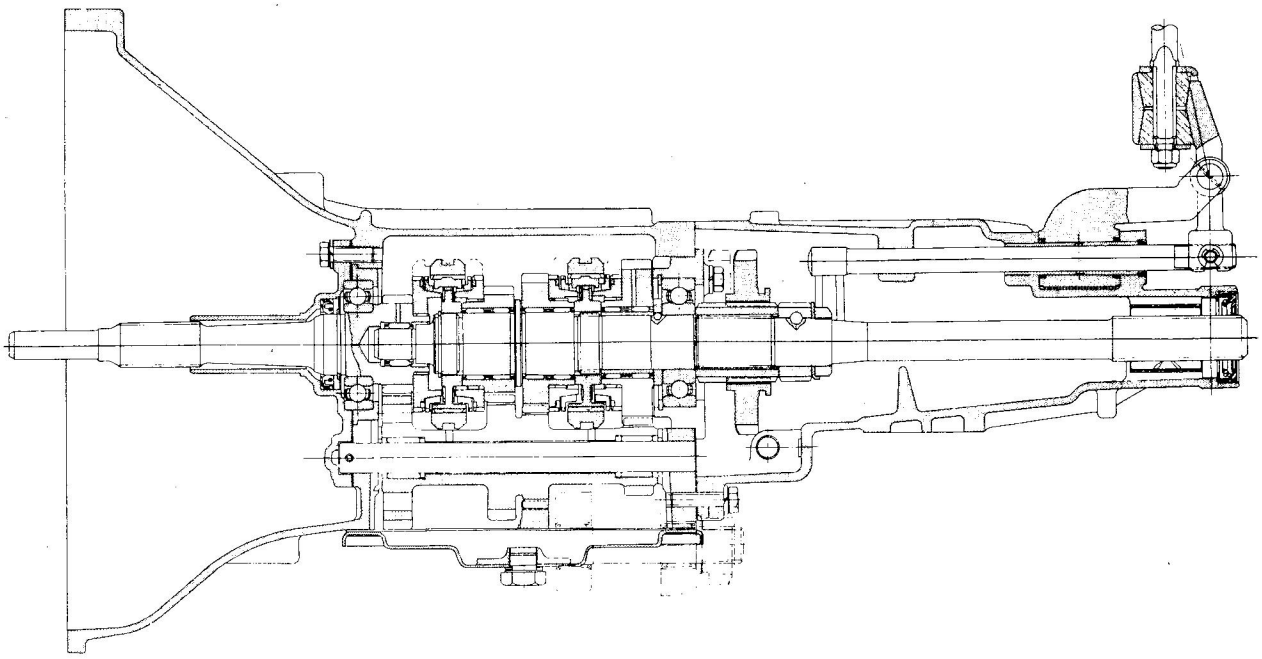
## CONTENTS



## DESCRIPTION

The type F4W63 transmission is used for floor shift type vehicle. The construction, however, is the same as that of the type R4W63 transmission in general. The difference between these transmissions is only in their control devices.

Thus, in this chapter, description is made mainly for the control system and relative matters.



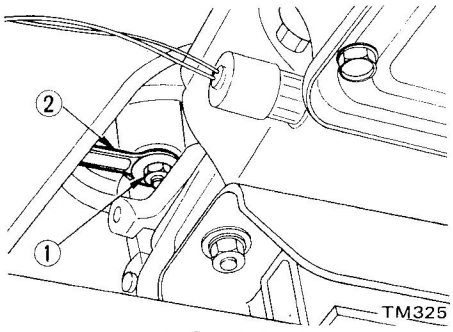
TM324

*Fig. TM-35 Sectional view of F4W63 transmission*

## REMOVAL AND INSTALLATION

Procedures for removal and installation of the F4W63L transmission are the same as the R4W63L transmission except for removal and installation of control device.

In removing and installing control lever, conduct those operations referring to Figure TM-36.



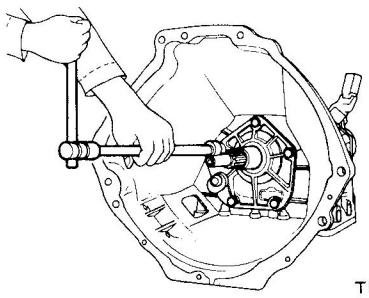

1 Spanner
2 Fixing nut

*Fig. TM-36 Removing and installing control lever*

## DISASSEMBLY AND ASSEMBLY

### Disassembly

1. Thoroughly wipe off dirt and grease from transmission.
2. Drain out oil in transmission case.
3. Place transmission on a safety stand securely.
4. Detach dust cover from transmission. Rmove withdrawal lever and release bearing.
5. Remove bolts securing front cover to transmission and detach front cover.

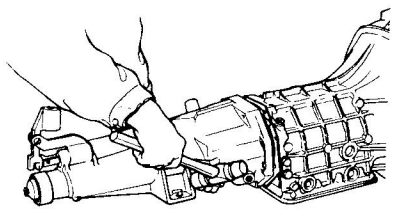


TM241

*Fig. TM-37 Removing front cover*

6. Detach bottom cover from transmission.
7. Remove back-up light switch and speedometer pinion with its sleeve.
8. Move gears to neutral position.
9. Remove rear extension housing mounting bolts and then detach rear extension housing.

If rear extension housing cannot be removed easily, do this housing by lightly tapping it with a soft hammer.



TM242

*Fig. TM-38 Removing rear extension housing*

10. Pull out striking rod pin (1) and remove striking rod (2 .

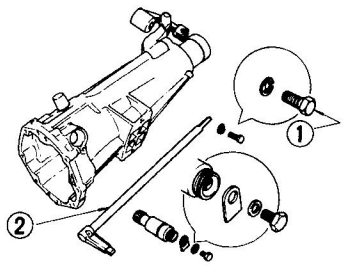
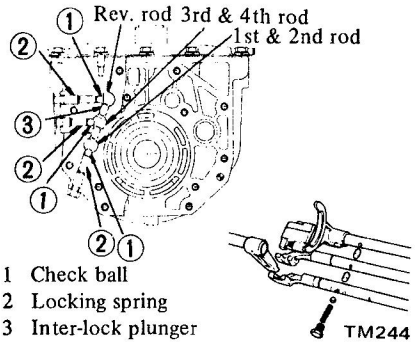



*Fig. TM-39 Disassembling rear extension*

### Gear assembly

1. Disconnect check ball plugs, and remove three locking springs and three check balls.

Take care not to lose these parts.




1 Check ball
2 Locking spring
3 Inter-lock plunger

*Fig. TM-40 Layout of check balls and interlock plungers*

2. Using Fork Rod Pin Punch ST23540000, drive out retaining pins from fork rods.

Take care not to lose plungers when removing fork rods.

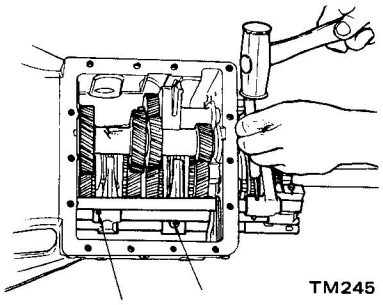



*Fig. TM-41 Removing retaining pins*

3. Mesh gears at two places. Straighten lock washer and loosen main shaft nut.

4. Using Countershaft Guide ST23100000, drive out countershaft from transmission case.

Exercise care not to drop needle bearings into case.

Remove countergear together with needle bearings and washers.

**Note: Make sure that thrust washers used between countergear and transmission case are removed.**

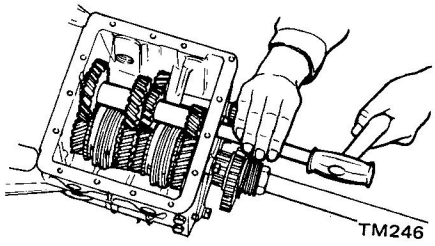



*Fig. TM-42 Driving out countershaft*

5. Pry off snap ring retaining reverse idler gear (helical gear).

Withdraw idler shaft together with idler gear (spur gear) from the rear side of transmission case.

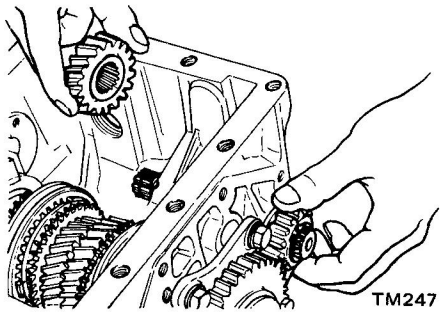



*Fig. TM-43 Removing reverse idler sahft*

6. Remove bolts securing main shaft bearing retainer, and then withdraw main shaft assembly from the rear side of transmission.

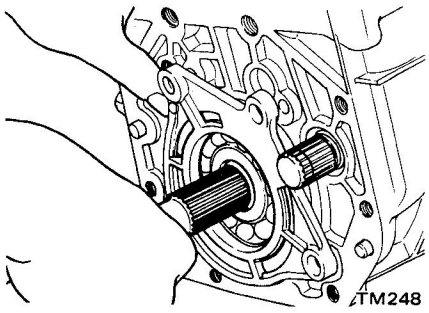



*Fig. TM-44 Removing main shaft assembly*

7. Take out pilot bearing located between main shaft and main drive gear.

8. Remove main drive gear by using the wooden handle of a hammer.

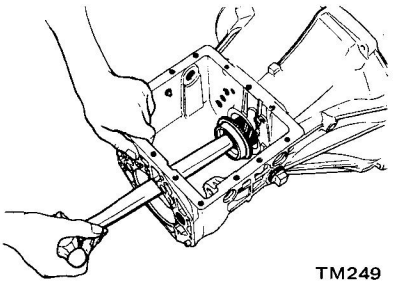



*Fig. TM-45 Removing main drive gear assembly*

### Assembly of main shaft, main drive gear and synchromesh

In disassembling these assemblies, refer to the procedure for disassembling those of the type R4W63 transmission. (See page TM-00)

## Assembly

To assemble, reverse the order of disassembly observing the following instructions.

### Front cover and rear extension housing

1. Make sure that front cover seal mating surface is clean. Using a press, drive new seal into place on front cover.

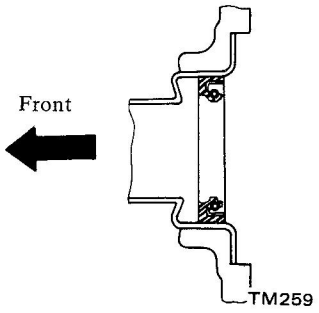



*Fig. TM-46 Location of front cover oil seal*

2. Wipe rear extension housing clean and then press new oil seal into position. Apply gear oil to sealing lip when installing oil seal.

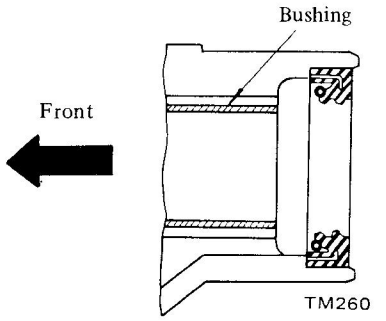



*Fig. TM-47 Location of rear extension housing oil seal*

3. Install striking rod in place on rear extension housing.

### Gear assemblies

To assemble gears disassembled, refer to the procedure for assembling those of the type R4W63L transmission. (See page TM-00)

### Shift forks and shift rods

1. Align 1st-2nd shift fork ① and 3rd-4th shift fork ② with the grooves in respective coupling sleeves and reverse-shift fork with the groove in reverse gear. See Figure TM-48.
2. Insert 1st-2nd shift rod ③ into position and drive in pin (10. With 1st-2nd shift rod in neutral position, install interlock plunger in position.
3. Insert 3rd-4th shift rod into position and secure with pin. Place 3rd-4th shift rod into neutral position and install interlock pluger ⑥ in position.
4. Insert reverse shift rod ⑨ into reverse shift fork and secure with pin.
5. Install check balls and locking springs at three places in transmission case, and tighten with check ball plugs.

Before tightening three plugs, apply sealant to plugs.

Plug tightening torque:
1.7 to 2.1 kg-m
(12 to 15 ft-lb)

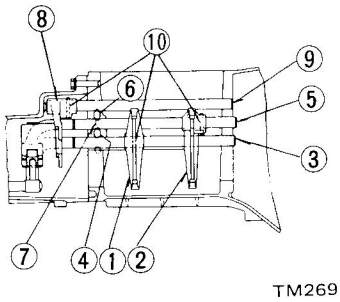



*Fig. TM-48 Installing shift rod and shift fork*

### Complete transmission assembly

1. Make sure that gears are placed into neutral position, and install rear extension housing to transmission case by properly aligning striking lever with shift rod brackets.

Rear extension housing bolt tightening torque:
1.4 to 1.8 kg-m
(10 to 13 ft-lb)

**Note: Apply sealant to each face of gasket to prevent oil leak.**

2. Install front cover on transmission case.

Install release bearing, withdrawal lever and dust cover in their positions.

Front cover bolt tightening torque:
0.8 to 1.0 kg-m
(5.8 to 7.2 ft-lb)

3. Install bottom cover to transmission case.

Bottom cover bolt tightening torque:
0.8 to 1.0 kg-m
(5.8 to 7.2 ft-lb)

## INSPECTION

Refer to the instructions for inspecting components of the type R4W63 transmission.

# TRANSMISSION GEAR CONTROL —COLUMN SHIFT CONTROL SYSTEM

## CONTENTS

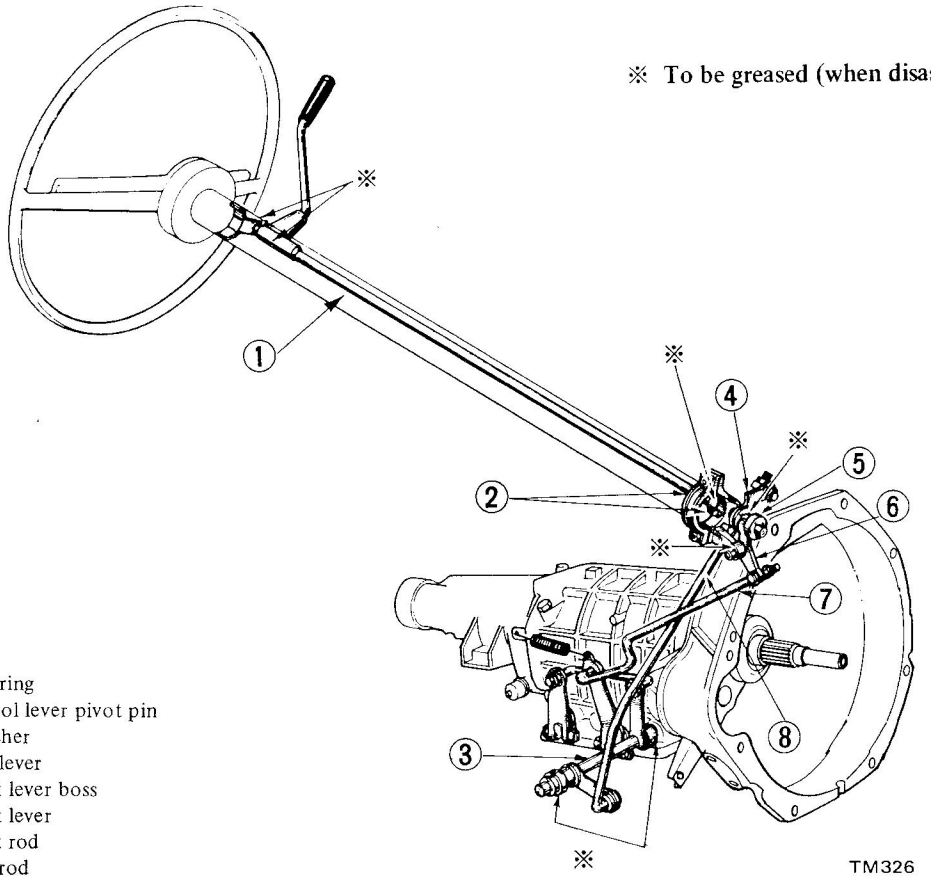



*Fig. TM-49 Control system (R4W63 transmission)*

## REMOVAL AND INSTALLATION

### Removal

1. Disconnect battery ground cable.
2. Remove horn pad.

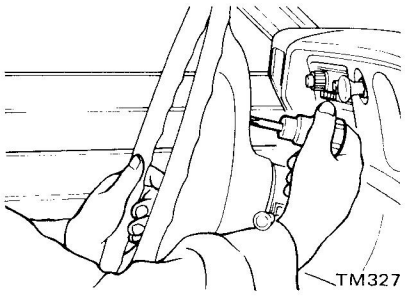



*Fig. TM-50 Removing horn pad*

3. Remove steering wheel.

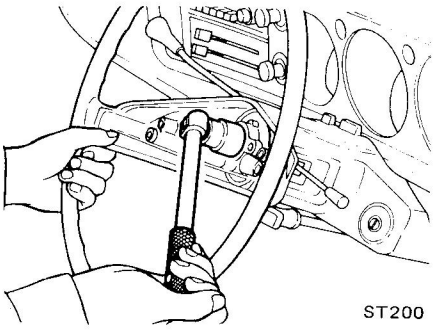



*Fig. TM-51 Removing steering wheel*

4. Remove steering column shells, turn signal and lighting switch assembly.
5. Remove "C" washer and washer.
6. Remove snap ring and control lever pivot pin, and then withdraw control lever.

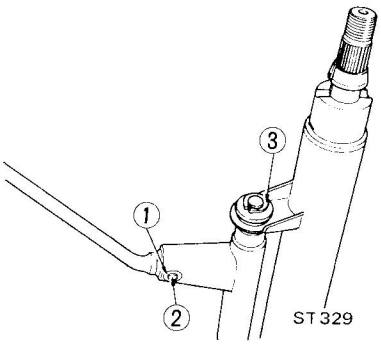



*Fig. TM-52 Withdrawing control lever*

7. Remove spring pins, plain washers and spring washers at trunnions of change speed lever ① and select gear lever ②, and then separate upper shift rod ③ and select rod ④ from levers.

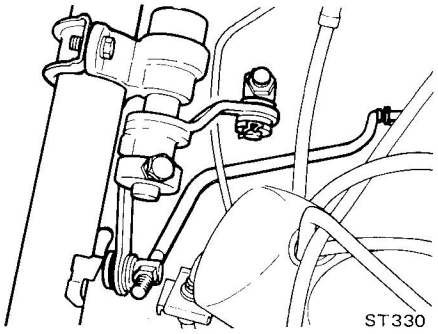



*Fig. TM-53 Separating rods from levers*

8. Remove two bolts securing lower bracket and its clamp.
9. After loosening locking screw, remove change speed lever from control rod.
10. Remove lower bracket with select gear lever by loosening lower bracket till its positioning knock pin can be freed from jacket tube.
11. Remove control rod from upper support depressing it downward and then withdraw it upwards.
12. Remove spring pins, plain washers and spring washers at select lever and shifting lever.
13. Separate select rod from select lever.
14. After separating upper and lower shift rods, remove cross shaft from transmission case side pushing it against retaining spring.

And then remove cross shaft from member side with retaining spring a little compressed.

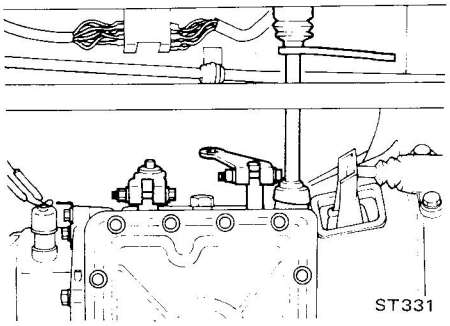



*Fig. TM-54 Removing cross shaft assembly*

## Installation

Install control system in the reverse sequence of removal.

When installing, apply specified grease to the following parts:

1. Select lever pivot bolt bushing
2. Select lever guide
3. Reverse check unit
4. Hand lever unit in upper portion of control rod
5. Both ends of cross shaft (socket ball and spherical bush)

# INSPECTION AND REPAIR

Check all sliding parts and other components for wear and other deflective conditions.

If any part is found to be defective, replace as required.

# ADJUSTMENT

## Shift linkage

1. Set outer lever ⑧ to neutral position.
2. Adjust trunnion nut ⑥, and tighten it when hand lever arrives "A" position.

## Select linkage

1. Arrange component parts so that reverse check return spring seat on lower bracket comes into contact with control rod ring.
2. In this arrangement, make sure that hand lever is in "B" position.
3. Set outer lever ⑨ to neutral position.
4. Tighten trunnion nut ⑥ at a position where no unreasonable force is applied to select rod.

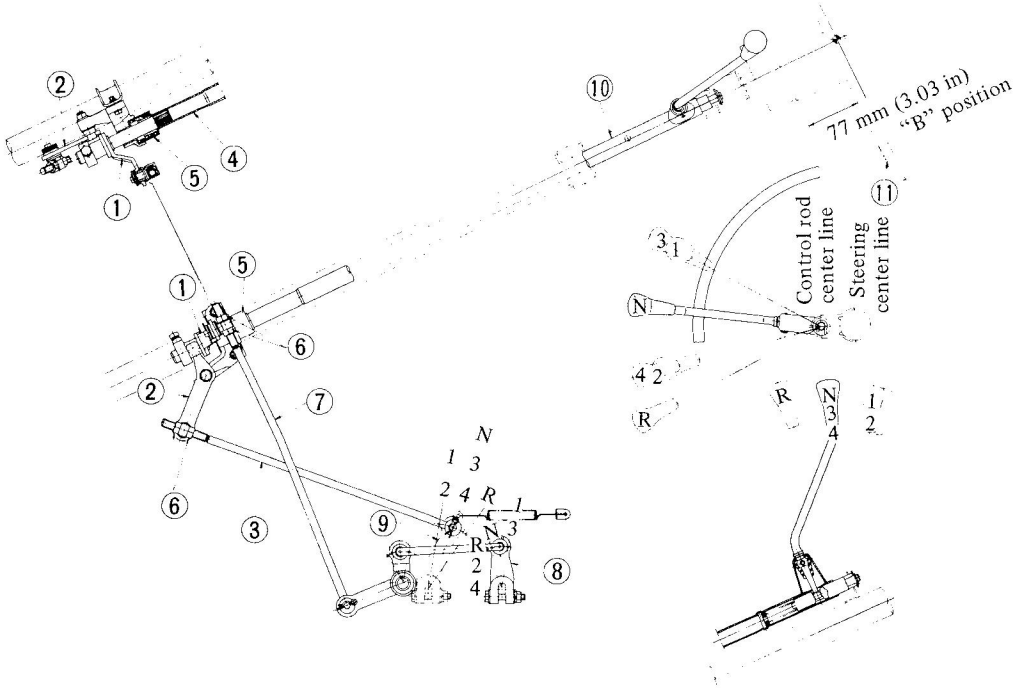



*Fig. TM-55 Adjusting control system*

# SERVICE DATA AND SPECIFICATIONS

| Item \ Model | | | L620T<br>LG620T | PL620TU | N620U<br>NL620<br>GN620U<br>GNL620 | NL620T<br>GNL620T | UNL620 | 620U<br>L620<br>G620U<br>GL620U | U620<br>UL620 |
|---|---|---|---|---|---|---|---|---|---|
| Final gear ratio | | | 4.875 | 4.375 | 4.625 | 4.625 | 4.375 | 4.875 | 4.625 |
| Transmission | Type | | F4W63 | | R4W63 | F4W63 | R4W63 | R4W63 | |
| | Gear ratio | 1st | 3.657 | | 4.243 | | | 5.000 | |
| | | 2nd | 2.177 | | 2.558 | | | 3.014 | |
| | | 3rd | 1.419 | | 1.589 | | | 1.685 | |
| | | 4th | 1.000 | | 1.000 | | | 1.000 | |
| | | Reverse | 3.638 | | 4.367 | | | 5.146 | |
| Speedometer gear ratio | | | 18/5 | 16/5 | 17/5 | | | 18/5 | |
| Tire size | | | 6.00-14<br>-8PRLT | 6.00-14<br>-6PRLT | 6.00-14-8PRLT | | 5.50-14<br>-6PRLT | 6.00-14<br>-8PRLT | 5.50-14<br>-6PRLT |

Note: Oil capacity ..... 1.7 liters ( ½ U.S.gal., ⅜ Imper.gal.)

Gear backlash

Standard backlash
(For all gear) mm (in) ..... 0.05 to 0.10 (0.0020 to 0.0039)

Gear end play

Standard end play
(For all gear) mm (in) ..... 0.05 to 0.15 (0.0020 to 0.0059)

Clearance baulk ring and gear mm (in) ..... 1.2 to 1.6 (0.0472 to 0.0630)

3rd-4th synchro hub adjusting snap ring .....

| No. | Thickness mm (in) |
|---|---|
| 1 | 1.40 to 1.45 (0.0551 to 0.0571) |
| 2 | 1.45 to 1.50 (0.0571 to 0.0591) |
| 3 | 1.50 to 1.55 (0.0591 to 0.0610) |
| 4 | 1.55 to 1.60 (0.0610 to 0.0630) |
| 5 | 1.60 to 1.65 (0.0630 to 0.0650) |

Main drive gear adjusting snap ring .....

| No. | Thickness mm (in) |
|---|---|
| 1 | 1.49 to 1.55 (0.0587 to 0.0610) |
| 2 | 1.56 to 1.62 (0.0614 to 0.0638) |
| 3 | 1.62 to 1.68 (0.0638 to 0.0661) |
| 4 | 1.68 to 1.74 (0.0661 to 0.0685) |
| 5 | 1.74 to 1.80 (0.0685 to 0.0709) |
| 6 | 1.80 to 1.86 (0.0709 to 0.0732) |
| 7 | 1.86 to 1.92 (0.0732 to 0.0756) |

Reverse idler gear adjusting snap ring .....

| No. | Thickness mm (in) |
|---|---|
| 1 | 1.15 to 1.25 (0.0453 to 0.0492) |
| 2 | 1.35 to 1.45 (0.0531 to 0.0571) |
| 3 | 1.25 to 1.35 (0.0492 to 0.0531) |
| 4 | 1.45 to 1.55 (0.0571 to 0.0610) |
| 5 | 1.05 to 1.15 (0.0413 to 0.0453) |

Counter gear adjusting rear thrust washer .....

| No. | Thickness mm (in) |
|---|---|
| 1 | 2.35 to 2.40 (0.0925 to 0.0945) |
| 2 | 2.40 to 2.45 (0.0945 to 0.0965) |
| 3 | 2.45 to 2.50 (0.0965 to 0.0984) |
| 4 | 2.50 to 2.55 (0.0984 to 0.1004) |
| 5 | 2.55 to 2.60 (0.1004 to 0.1024) |

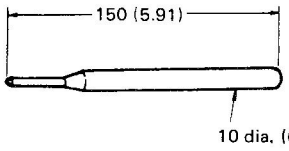
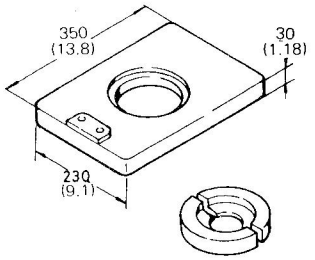
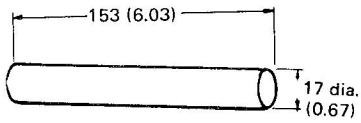
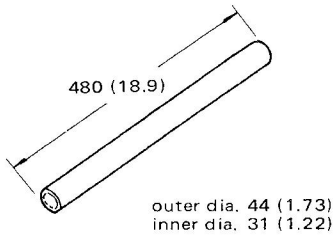
Tightening torque

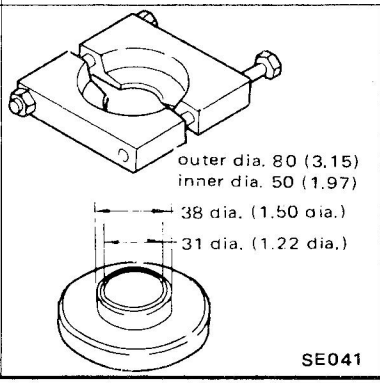
| | kg-m | (ft-lb) |
|---|---|---|
| **Transmission proper** | | |
| Engine/transmission installation bolt | 2.4 to 2.8 | (17 to 20) |
| Front cover/transmission installation bolt | 0.8 to 1.0 | (5.8 to 7.2) |
| Rear extension/transmission installation bolt | 1.4 to 1.8 | (10 to 13) |
| Main shaft tightening nut | 8 to 11 | (58 to 80) |
| Companion flange tightening nut | 10 to 14 | (72 to 101) |
| Rear engine mount installation bolt | 3.3 to 3.8 | (24 to 28) |
| Filler plug | 2.5 to 3.5 | (18 to 25) |
| Drain plug | 2.0 to 3.0 | (15 to 22) |
| Back-up lamp switch | 2.0 to 3.0 | (15 to 22) |
| Bottom cover installation bolt | 0.8 to 1.0 | (5.8 to 7.2) |
| Speedometer pinion installation bolt | 0.3 to 0.4 | (2.2 to 2.9) |
| Interlock plug | 1.7 to 2.1 | (12 to 15) |
| Operating lever (for both shift and select) | 0.3 to 0.4 | (2.2 to 2.9) |
| Reverse check | 2.0 to 3.0 | (15 to 22) |
| **Transmission gear control (column shift)** | | |
| Transmission outer lever | 0.8 to 1.0 | (5.8 to 7.2) |
| Trunnion nut (for both shift and select) | 2.0 to 2.8 | (15 to 20) |
| Select lever pivot bolt | 0.5 to 0.8 | (3.6 to 5.8) |
| Lower support bracket | 0.6 to 1.0 | (4.3 to 7.2) |
| Steering wheel tightening nut | 7.0 to 7.5 | (51 to 54) |
| **Transmission gear control (floor shift)** | | |
| Control lever installation bolt | 1.9 to 2.2 | (14 to 16) |

# TROUBLE DIAGNOSES AND CORRECTIONS

| Condition | Probable cause | Corrective action |
|---|---|---|
| **Difficult to intermesh gears**<br>Causes for difficult gear shifting are classified to troubles concerning control system and transmission. When gear shift lever is heavy and it is difficult to shift gears, clutch disengagement may also be unsmooth. First, make sure that clutch operates correctly, and inspect transmission. | Worn gears, shaft, and/or bearing.<br>Insufficient operating stroke due to worn or loose sliding part.<br>Defective or damaged synchronizer. | Replace.<br>Repair or replace.<br>Repalce. |
| **Gear slips out of mesh.**<br>In most cases, this trouble occurs when interlock ball, check ball, and/or spring is worn or weakened, or when control system is defective. In this case, the trouble cannot be corrected by replacing gears, and therefore, trouble shooting must be carried out carefully. It should also be noted that gear slips out of mesh due to vibration generated by weakened front and rear engine mounts. | Worn interlock plunger.<br>Worn check ball and/or weakened or broken spring.<br>Worn fork rod ball groove.<br>Worn or damaged bearing.<br>Worn or damaged gear. | Replace.<br>Replace.<br>Replace.<br>Replace.<br>Replace. |
| **Noise**<br>When noise occurs with engine idling and ceases when clutch is disengaged, or when noise occurs while shifting gears, it may be that the noise is from transmission.<br>(Transmission may rattle during engine idling. Check air-fuel mixture and ignition timing. After above procedure, readjust engine idling.) | Insufficient or improper lubricant.<br>Oil leaking due to defective oil seal and gasket, clogged breather, etc.<br>Worn bearing (High humming occurs at a high speed.).<br>Damaged bearing (Cyclic knocking sound occurs also at a low speed.).<br>Worn each spline.<br>Worn each bushing. | Add oil or replace with designated oil.<br>Clean or replace.<br>Replace.<br>Replace.<br>Replace.<br>Replace. |

# SPECIAL SERVICE TOOLS

| No. | Tool number & tool name | Description (Unit: mm (in)) | | For use on | Reference page or figure No. |
|---|---|---|---|---|---|
| 1. | ST23540000 (Former Tool No. ST23510000)<br>Fork rod pin punch |  | This tool is used to drive out fork rod retaining pin. | R4W63L & F4W63L T/M | Fig. TM-11<br>Fig. TM-41 |
| 2. | ST22130000<br>Synchronizer hub puller |  | This tool is used to pull out synchronizer hub. | 620<br>521<br>780 | Fig. TM-14 |
| 3. | ST23100000<br>Countershaft guide |  | This tool is used to prevent needle bearing from falling off when countershaft is removed from, or inserted into, the transmission case. | R4W63L & F4W63L T/M | Fig. TM-10<br>Page TM-8<br>Fig. TM-42 |
| 4. | ST23800000<br>Transmission adapter |  | This tool is used to install main shaft bearing. | 620<br>521<br>S30<br>230<br>130 | Fig. TM-22 |

| No. | Tool number & tool name | Description<br>Unit: mm (in) | | For use on | Reference page or figure No. |
|---|---|---|---|---|---|
| 5. | ST3003S000<br>(Former Tool No. ST30030000)<br>Drive pinion rear bearing inner race replacer<br>— ST30031000 Puller<br>— ST30032000 Base |  | This assembly is used to pull out main drive bearing. | 63L & 71B T/M | Fig. TM-18 Page TM-7 |